

Attorney Docket No. ANO6272/3554  
Serial No. 10/644,488

### **REMARKS**

Claim 1 has been amended and new claims 21 and 22 have been added. Accordingly, claims 1, 4, 6, 8, 10, 12, 14, 21 and 22 are currently pending for consideration.

#### **I. Amendments:**

Claim 1 was amended to recite that the colloidal silica particles are dispersed in a solvent in a concentration from about 10 to about 70 wt% counted as dry weight of silica. Support for amended claim 1 can be found at page 3, lines 31-34 of the specification. No new matter has been added.

New claim 21 has been added to specify the amount of the gelling agent, i.e., that it is added resulting in an amount of from about 1 to about 30% of the total dry weight of silicate and silica particles. Support for new claim 21 can be found in the specification on page 4, lines 33-34. Again, no new matter has been added.

New independent claim 22 recites the elements of amended claim 1 and also specifies that the gelling agent is in an amount effective to result in a gelling time from about 1 minute to about 24 hours. Support for new claim 21 can be found in original claim 1 and the specification at page 3, lines 31-34 and page 5, line 36 to page 6, line 4. No new matter has been added.

#### **II. Rejections:**

##### **Rejections based on 35 U.S.C. § 102(b)**

On pages 2-3, sections 1 and 2 of the Office Action, claims 1, 4, 6, 8, 10, 12, and 14 were rejected under 35 U.S.C. § 102(b) as being anticipated by Shimada et al, JP 2001-3047 (hereinafter "Shimada et al.").

The Shimada et al. reference is directed to an alkali silica consolidation grout having a low silica concentration and long gelation time that is purported to allow permeation into a wide range of land soil as a grout for preventing ground liquefaction. Shimada et al. disclose that the alkaline silica solution contains colloidal silica and water glass, in which the  $\text{SiO}_2$  concentration of the solution is diluted into a range from 3 to 13 wt%, while the amount of  $\text{SiO}_2$  attributable to colloidal silica is adjusted to correspond to 1 to 50 wt% of the total amount of  $\text{SiO}_2$  contained in the solution.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989).

Nowhere do Shimada et al. disclose a method of sealing a leaking part or cavity comprising injecting into the leaking part or cavity a grouting composition that includes colloidal silica particles dispersed in a solvent in a concentration from about 10 to about 70 wt% counted as dry weight silica, as presently claimed in amended claim 1.

In paragraph 24, Shimada et al. teach that "the  $\text{SiO}_2$  concentration of the alkaline solution must be kept in a range from 3 to 13 wt%." (Emphasis added). This is because, according to Shimada et al., the alkaline silica solution per se gels and cannot be kept stable, if the amount of  $\text{SiO}_2$  is higher than 13 wt%. Moreover, in paragraph 25, Shimada et al. teach that "the amount of  $\text{SiO}_2$

Attorney Docket No. ANO6272/3554  
Serial No. 10/644,488

attributable to colloidal silica ... must be kept in a range from 1 to 50 wt%."

(Emphasis added). This is because, according to Shimada et al., the initial strength of the consolidated mass becomes low if the total SiO<sub>2</sub> contains more than 50 wt% colloidal silica.

Since Shimada et al. disclose that the colloidal silica corresponds to 1 to 50 wt% of the total amount of SiO<sub>2</sub> in the solution (with the total amount of SiO<sub>2</sub> including colloidal silica, silicate, and optionally present active silicic acid) and that the solution contains 3 to 13 wt% total SiO<sub>2</sub>, the solution would contain, at a maximum, 6.5 wt% SiO<sub>2</sub> derived from colloidal silica to achieve the required stability and strength.

In contrast, the claimed invention includes a grouting composition that includes colloidal silica particles dispersed in a solvent in a concentration from about 10 to about 70 wt% counted as dry weight silica.

Therefore, as Shimada et al. do not disclose each and every element as set forth in the present claims and do not show the identical invention in as complete detail as claimed, it is respectfully submitted that Shimada et al. cannot anticipate the present claims. See *Verdegaal Bros.*, 814 F.2d at 631 and *Richardson*, 868 F.2d at 1236.

Accordingly, it is respectfully requested that the rejections of claims 1, 4, 6, 8, 10, 12, and 14 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Shimada et al. be withdrawn.

Attorney Docket No. ANO6272/3554  
Serial No. 10/644,488

**Rejections based on 35 U.S.C. § 103(a)**

On pages 3-5, sections 3 and 4 of the Office Action, claims 4 and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Shimada et al., in view of U.S. Patent No. 5,370,478 to Bartlett et al. (hereinafter "Bartlett et al.") and W.R Grace internet posting for LUDOX® (hereinafter "LUDOX").

Bartlett et al. was cited merely for its disclosure of using non-aggregated colloidal silica sols in a gellable grout solution. The Office Action states that "non-aggregated inherently teaches an S value of between about 30 and 90," as claimed in claim 4. Applicants respectfully traverse.

S value is dependent upon the silica content, the viscosity, and the density of the colloidal silica. The S value represents the amount of silica in percent by weight present in the dispersed phase. See Application at Page 4, lines 11-15. It is respectfully submitted that non-aggregated colloidal silica could have an S value in excess of 90. Inherency must be a necessary conclusion from the prior art, not merely a possible one. See *In re Oelrich*, 666 F.2d 578, 581, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981). It is unclear what factual and technical grounds the Office Action is using to assert that the colloidal silica disclosed by Bartlett et al. necessarily has an S value between about 30 and 90.

Further, claim 4 depends from claim 1, which includes a combination of an alkali metal or organic silicate and colloidal silica particles. Bartlett et al. teach away from such a combination. In that regard, Al or Fe salts, alkali metal silicates, and silica sols are only listed in Bartlett et al. as alternatives, and are not taught in combination. See, for example, the abstract (e.g., "containing

Attorney Docket No. ANO6272/3554  
Serial No. 10/644,488

water-soluble Al or Fe salts, alkali metal silicates, or silica sols") and col. 5, lines 12-19.

Moreover, as discussed more fully above, Shimada et al. teach away from using a grouting composition that includes colloidal silica particles dispersed in a solvent in a concentration from about 10 to about 70 wt% counted as dry weight silica, as presently claimed in amended claim 1. In that regard, Shimada et al. teach that the SiO<sub>2</sub> concentration of the alkaline solution must be kept in a range from 3 to 13 wt% and that the amount of SiO<sub>2</sub> attributable to colloidal silica must be kept in a range from 1 to 50 wt%. This results in a solution containing a maximum of 6.5 wt% SiO<sub>2</sub> derived from colloidal silica to achieve the required stability and strength.

As claim 4 depends from claim 1 and both references teach away from the invention presently claimed in claim 4, it is respectfully submitted that claim 4 is not obvious over Shimada et al. in view of Bartlett et al.

The LUDOX reference was merely cited for its disclosure of mono-dispersed colloidal silica having a "very narrow particle size distribution." The Office Action indicates that it would have been obvious to one skilled in the art to use silica particles having a relative standard deviation of the particle size distribution lower than about 15% by numbers, as claimed in claim 12, based on the availability of the LUDOX colloidal silica. Applicants respectfully traverse.

Although LUDOX discloses colloidal silica having a "very narrow particle size distribution," it has not been established that the LUDOX silica falls within the claimed parameters of claim 12. It is respectfully submitted that there is no motivation, to one skilled in the art, to modify the teachings of Shimada et al.

Attorney Docket No. ANO6272/3554  
Serial No. 10/644,488

based on the general disclosure of LUDOX (of a "very narrow particle distribution") to use silica particles having a specific relative standard deviation of the particle size distribution lower than about 15% by numbers, as claimed in claim 12.

Moreover, as claim 12 depends from claim 1, for the reason discussed above, Shimada et al. teach away from the invention as presently recited in claim 12. Nowhere does LUDOX teach or suggest a grouting composition containing a combination of an alkali metal or organic silicate, colloidal silica particles and at least one gelling agent, as recited in amended claim 1, or provide any motivation to modify Shimada et al. to provide such a composition.

Accordingly, it is respectfully requested that the rejections of claims 4 and 12 under 35 U.S.C. § 103(a) as being unpatentable over Shimada et al., in view of Bartlett et al. and LUDOX, be withdrawn.

### **CONCLUSION**

In light of the foregoing, Applicants respectfully submit that the application as amended is now in proper form for allowance, which action is earnestly solicited. If the Examiner has any questions relating to this Amendment or to this application in general, it is respectfully requested that the Examiner contact Applicants' undersigned attorney at the telephone number provided below.

Respectfully submitted,



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